Hyper.X™ Readers
LMB603x-B series

Including LMB 6033-B, LMB 6034-B and LMB 6035-B readers models

User Manual

Ref: MU-LMB603X-V1.2-GB

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PREFACE

Purpose of this manual

This manual presents the BALOGH LMB603x series equipments.
It then indicates how to install it and how to use it.
The interfacing manual for the Hyper X (ref 13053/104) readers complete the information relating to the interfaces given in this manual.

Reference of the manual

The manual's generic reference is:

MU- <name of equipment> -II-L

in which:

MU denotes User Manual

II is the version number.

L is the language in which the manual is written

Update

Version no.	Date	Nature of the modification
1.0	21/07/2010	Creation
1.1	27/07/2010	Addition §4.4
1.2	10/09/2010	Minor corrections

Note

The information contained in the present manual may be modified without prior notice.
The company BALOGH cannot be held responsible for the consequences of any errors or omissions, or for the erroneous interpretation of the information.

MEANING OF THE SYMBOLS

The symbols used in this manual have the following meaning:

Warning :
Warning information for proper operation of the component. Ignoring this information can cause device damages or destruction.

Important
Important information for proper handling of the component. Ignoring this information can cause device malfunction.

Remark
Tips or useful information. This information will help you to best use the device and its functionality.

General remarks

Warning:
The badges intended to use with the long range readers may be deprogrammed or damaged when using mobile phones in direct vicinity.
A clearance distance between the badges and mobile phones must be at least 10 cm.

The installation of the long range reader may only be carried out in places that fulfil climatic and technical conditions stated by the manufacturer.
BALOGH is not liable for damages resulting from improper handling or incorrect installation.

Remark:
All reconstructions or technological changes result in complete exclusion of liability.

1. PRESENTATION

The LMB 603x series long range readers represent a dynamic identification system.

They can read dedicated badges at nominal distances up to:
- 4 meters (order no. LMB 6033-B),
- 6 meters (order no. LMB 6034-B),
- 8 meters (order no. LMB 6035-B),

respectively.

Due to theirs robust construction they are designed both for indoor and outdoor use

HyperX™ LMB_603x series readers are standard mono block readers integrated in a waterproof case. They are presented in the form of a square casing equipped with five gland cable entry at the bottom and with an articulated back plate.

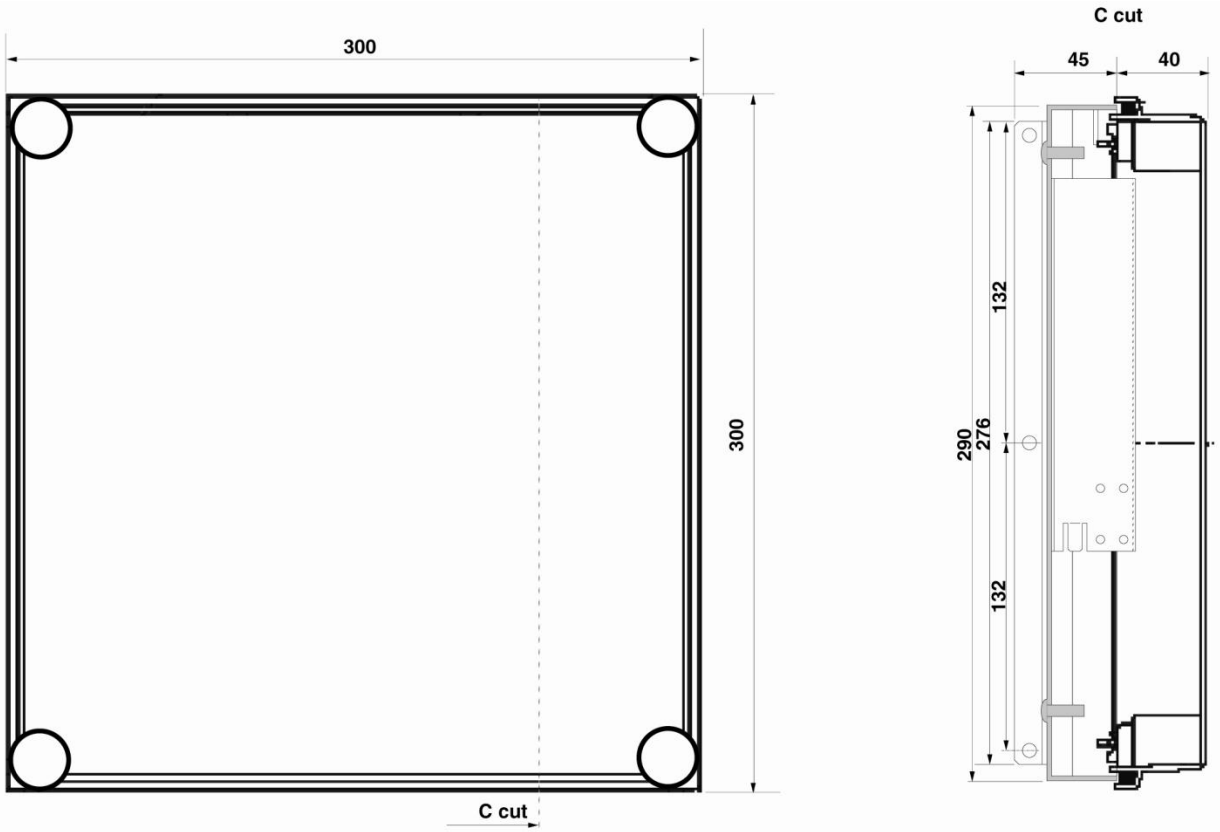
LABELLING:

Made in France
HYPER X™
Radio Identification
type: LMB-6035
N/S:
Power: 12V-24V DC= 1A max
BALOGH
CE 0682
FCC ID:
This devices complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2. DESCRIPTION

2.1. PRODUCT DESCRIPTION

The HyperX™ LMB_603x-B series are mono block readers consisting of a standard reader base, with an antenna panel inside a waterproof casing adapted for outdoor installation.



The LMB_603x series readers are compact readers. They come in the form of a polycarbonate cover without halogen locked on a metallic base:

- External dimensions: 300x300x85mm +/-1mm
- Weight: 5 Kg
- Cover Colour: Grey RAL 7035
- Cover Mechanical resistance: see manufacturer's doc (FIBOX ref. EKI 33/40G)
- Protection IP65
- Power supply: Between +12VCC and +24VCC, max. current 1.5A.
- Operating temperature: from -20°C up to +70°C

Included in delivery

- Mono block reader
- 50mm fastening clamp (2 pieces)
- Documentation

Not included in delivery:

- Main power supply adaptor
- Cables and other installation materials

2.2. EXTERNAL CASING DESCRIPTION

The LMB 603x series casing is composed of

	Manufacturer	Manufacturer's reference
Cover	FIBOX	EKI 33/40 G
Casing base	BALOGH	-
Rear plate	BALOGH	-
Small rods (qty 2)	BALOGH	-
Hex socket screws (qty 6)	Divers	HC M6x12 “stainless steel”
Hex nuts (qty 4)	Divers	H M6 “stainless steel”
Black Caps (qty 4)	FIBOX	BS 12138
Glands (qty 5)	FIBOX	FEM 5-7
Cover Key	FIBOX	HS 12112

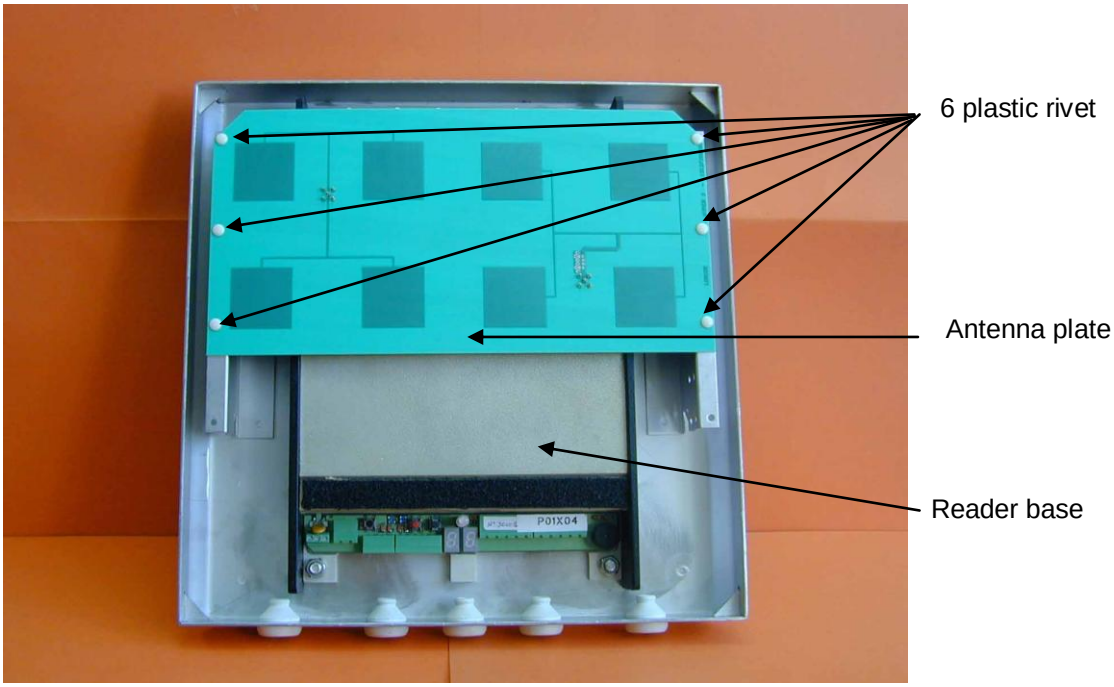
The complete casing is available separately under reference BOX 8008.
The five glands can take a cable with a diameter of between 5 mm and 7 mm.

The back plate associated with the small rods permit the inclination of the reader. (see chapter 4.2 for more information)

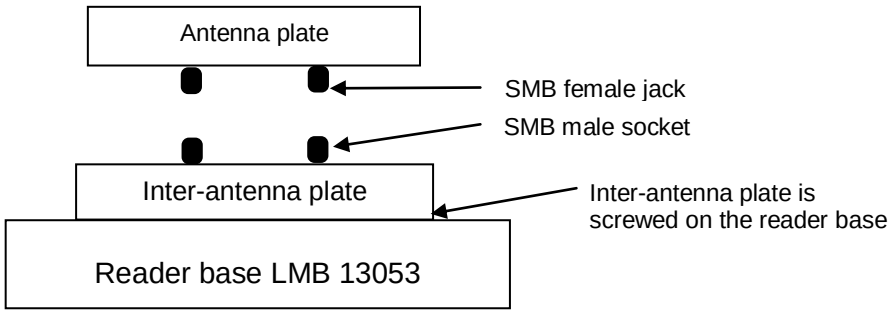
2.3. INTERNAL CASING DESCRIPTION

The internal LMB 603x-B reader consists of:

	Manufacturer	Manufacturer's reference
Electronic reader base	BALOGH	BAS 60x3 (for LMB 6033-B) BAS 60x4 (for LMB 6034-B) BAS 60x5 (for LMB 6035-B)
inter-antenna plate	BALOGH	-
plastic rivets	Divers	-
4+4 patch antenna plate	BALOGH	203094



Internal connection of the antenna plate



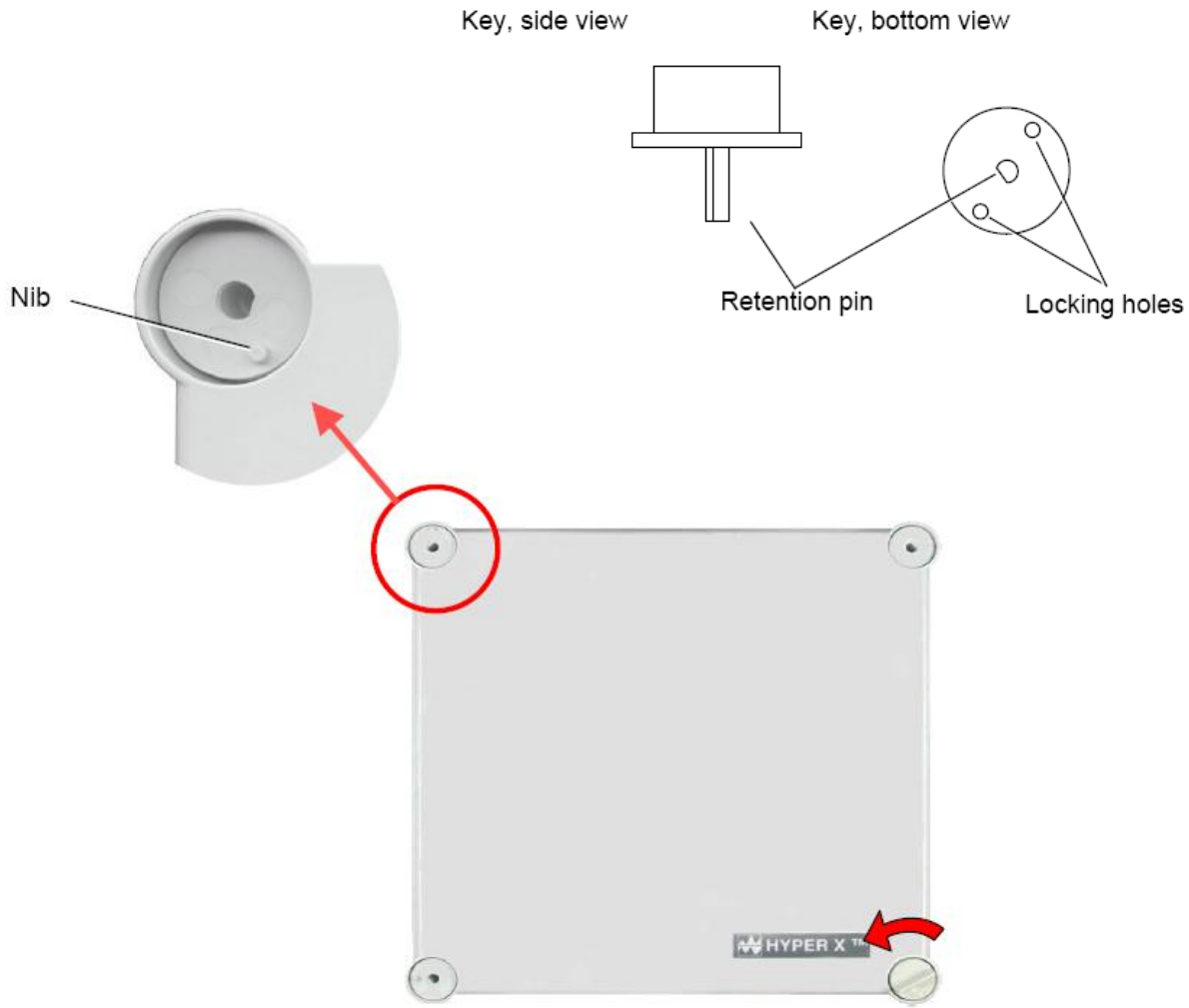
It might be possible during transportation, a rivet has moved off or the SMB jack & socket assembly is no more correctly established.
Please to verify these points at reader reception for proper operation.

2.4. OPENING THE HOUSING

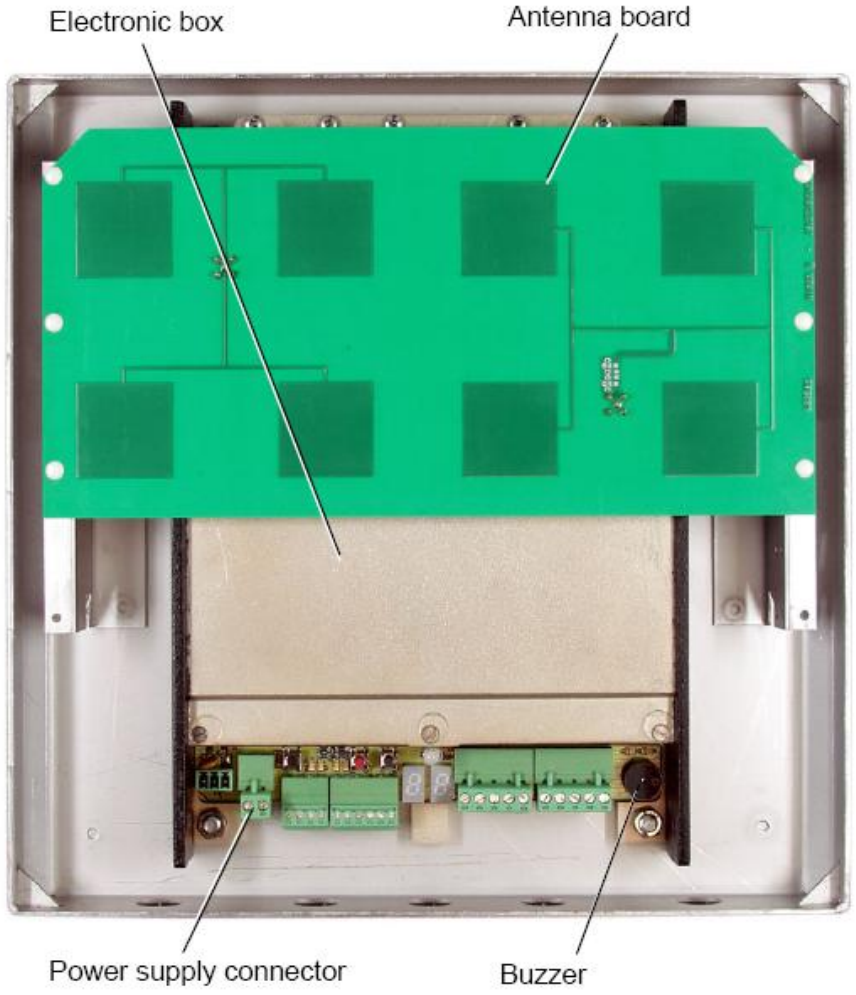
Open the housing with the included plastic key. The plastic key has a flattened retention pin and two locking holes at the bottom side.

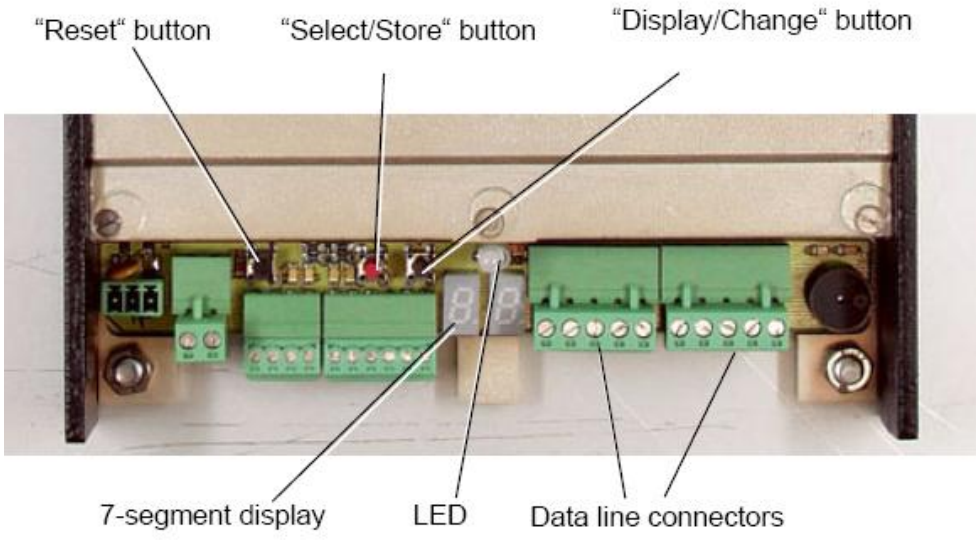
Please insert the retention pin into the lock and press it down so that the nib interlocks with the key's locking hole. With a quarter-turn to the left the lock opens. Pull out the plastic key and repeat this process with all locks. Now you can lift off the reader's housing lid.

To close the housing lid again simply put it back on the housing and press it down slightly.
You can now close the housing with a quarter-turn to the right. After you have carried out the connections you can protect the locks using the black caps.



2.5. FUNCTIONNAL DESCRIPTION





2.5.1. DESCRIPTION OF COMPONENTS

Electronic box
The electronic box is the main item of the reader. It comprises the high frequency generator, the control unit and the demodulator as well as supporting circuitry like voltage regulators and interfaces.

Antenna board
Represents the transmission / receiving antenna for badge data reading.

Power supply connector
Connecting element for supply voltage. Take care of correct polarity when connecting.
Refer to chapter 3.4.1.

Buzzer
Piezo-electronic signal device to generate acoustic signals.

“Select/Store” key
The “Select/Store” key is used to select parameters and store them.
Chapter 3.2 describes the procedure.

“Display/Change” key
The “Display/Change” key is used to display parameters and change them.
Chapter 3.2 describes the procedure.

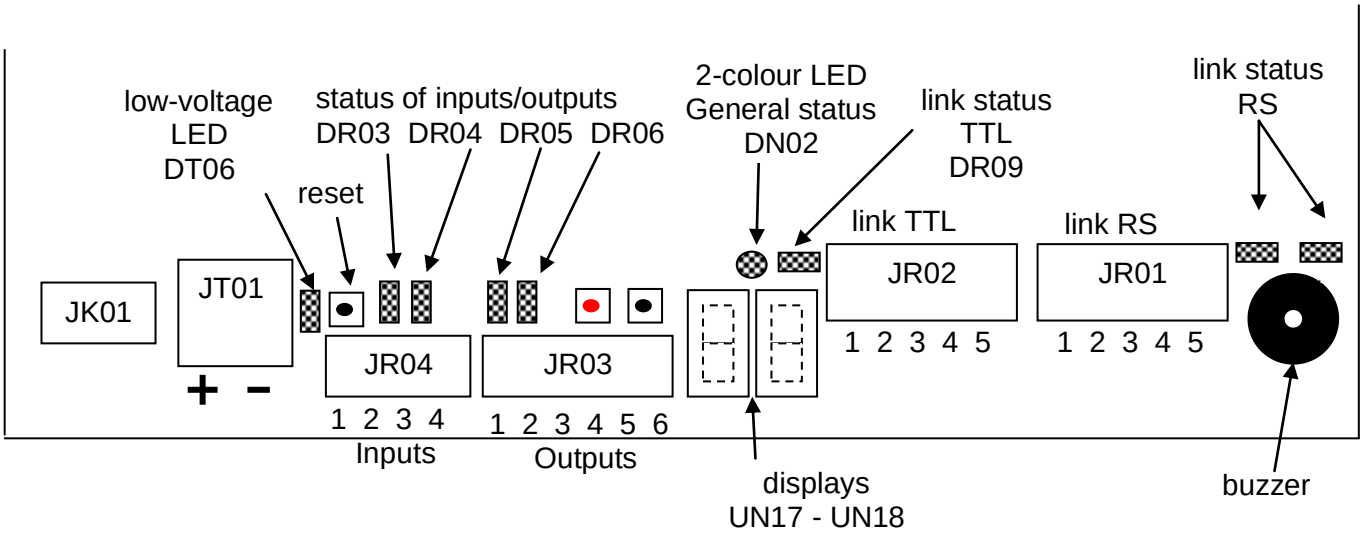
“Reset” key
The “Reset” key fulfils two functions: leaving the parameter setting mode when used individually, see chapter 3.2.
When used together with the “Display/Change” key a complete reset to the factory default settings is carried out. Refer to chapter 3.2.

7-segment display
The 7-segment display is used to display the parameter names and the according values during parameter setting. If necessary due to the mounting position, the reading direction may be changed by 180 degrees, see chapter 5.1, digit 1.

LED
The bicolor LED indicates diverse operation modes by different behavior. Only for service purposes.

Data line connector
At this connector the cabling of the serial interface may be attached. Refer to chapter 3.4.1.

2.5.2. USER-MACHINE INTERFACE DESCRIPTION



Connectors

There are several PHOENIX - type connectors:

- The 5-pin connectors (5.08mm pitch) – JR01 & JR 02 are for the serial link to a host.
- The small 4-pin connector (3.81mm pitch) – JR04 is for control inputs
- The small 6-pin connector (3.81mm pitch) – JR03 is for control outputs
- The 2-pin connector (5.08mm pitch) – JT01 is for the DC power supply
- The 3-pin connector (3.81mm pitch) – JK01 is for service only.

The principal control features are

- a 2-colour led (DN02) indicating the status of the reader and the presence of one or more tags,
- a buzzer that sounds when a tag is detected (if activated),
- a reset push button (black),
- a control panel consisting of two 7-segment displays (UN17-UN18) and two push buttons

Refer to the interface manual (doc n°13053-104) for complete description

3. CONFIGURATION OF THE READER

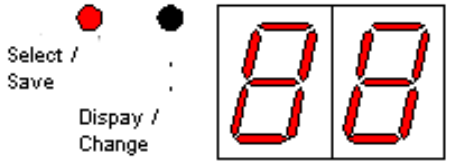
This operation requires opening of the cover and must be performed by a confirmed professional.

3.1. ACCESS TO THE CONTROL PANEL

Remove the cover of the casing to access the reader base control panel.

3.2. USE OF THE CONTROL PANEL

Role of the buttons:



Red button
- select a parameter
- save the modified parameter

Black button
- displays the value of the selected parameter
- selects the value of the chosen parameter

To display the parameter you want, press the red button until the corresponding mnemonic is displayed (cyclical display).
To display the value of this parameter, press the black button until the mnemonic displayed corresponds to the desired value (cyclical display).
Press the red button again to save this value (during the save, "SA" is displayed for 1 second).

To sum up, starting from a given status and, depending on the button chosen, the effects are as follows

status		press button	consequence
display off	⇗	red	displays mnemonic of 1st parameter
	⇘	black	nil
display mnemonic of parameter n	⇗	red	displays mnemonic parameter n+1
	⇘	black	displays value parameter n
display value of parameter n	⇗	red	displays mnemonic parameter n+1
	⇘	black	displays next value + “.”
display value + “.”	⇗	red	displays “SA”, save
	⇘	black	displays following value + “.”

Refer to interface manual (doc n°13053-104) for complete description

Note:

1. If you do not want to save a modified parameter
   - wait until the 8 second time out is up
   - OR press the Reset button

2. By default, the display units are read vertically, with the led underneath. If the reader must be assembled with the led uppermost, the read direction can be inverted by changing the first parameter. In this case, the black and red buttons retain their functions.

3. The display sequence of the black and red buttons is cyclical.The successive parameters are obtained either by briefly pressing the button, or by keeping it pressed down, which will make the parameters scroll down every 0.3 s.

4. To return to the default values (factory settings) press simultaneously on the Reset button and the Change button (black).

3.3. ADJUSTABLE PARAMETERS

The parameters are displayed in the order that follows and are saved in non-volatile memory:

n°	Parameter	Mnemonic	Value	Visible value
1	Display direction	--	0	uP
			1	dn
2	Channel number	nC	0 à 31	0 à 31
3	Reread time	tP	0,1 s	0
			0,5 s	1
			1 s	2
			2 s	3
			5 s	4
			10 s	5
4	Buzzer	bu	OFF	oF
			ON	on
5	Issuer code filtering	FI	none	0
			1er code	1
			EEPROM	2
6	Integrator code size	tC	3	3
			4	4
7	Antenna read LED	LE	normal	oF
			other	on
8	Type of functioning	tF	0	0
			1	1
			2	2
			3	3
9	Function tags	bF	OFF	oF
			ON	on
10	Journal	Jo	none	oF
			1	1
			2	2
			3	3
11	Type of RS interface	tA	RS 232	23
			RS 422	42
			RS 485	48
12	Type of CO interface	tO	not used	nu
			ISO2 fix	IF
			ISO2 variable	Ir
			WIEGAND	IE
13	JBUS Address	Ad	1, 2, …,31	1 à 31
14	Rate	br	9 600	96
			4 800	48
			1 200	12
			19 200	19

n°	Parameter	Mnemonic	Value	Visible value
15	Character format	Fo	8 bits/without parity	8n
			7 paired bits	7P
			7 unpaired bits	7I
16	Frame type	Fr	ASCII with header	AS
			ASCII without header	CS
			Reserved Format	td
			JBUS	Jb
17	Polling/Interrupt	Po	Interrupt	oF
			Polling	on
18	MTBM	tb	0,1 s	0
			0,2 s	1
			0,5 s	2
			1 s	3
			2 s	4
19	No of transmissions	nE	1 to 4	1 à 4
20	Output 1	S1	not used	oF
			buzzer copy	1
			2s read	2
			host	3
			green LED	4
21	Output 2	S2	not used	oF
			vehicle BF	1
			Tag battery low	2
			host	3
			red LED	4
22	Range	Pr	0 to 3	0 à 3
23	Reserved			
24	Entry 1	E1	inactive	oF
			Read on active	on
25	Entry 2	E2	inactive	oF
			Read on hold	on
26	Reserved			
27	Period of hops	PE	100 ms	0
			150	1
			200	2
			300	3
			400	4
			500	5
			800	6
			1000	7

EXPLANATIONS

1. DISPLAY DIRECTION

Allows the reader to be installed facing up or down, for the LED under the display (choose "uP") or above the display (choose "dn"). The buttons keep their functions.

2. CHANNEL

This is the operating channel. The channels / frequencies table of correspondence is given in the interface manual.

The special case of channel 0 corresponds to the "frequency hopping"; the hop period is determined by parameter 27.

3. RE-READ TIME

This is the time during which the tag code stays in the internal memory after its last detection. It corresponds to the minimum time during which the tag must not be detected so that it can be detected again. During this period the reader regards the tag as present in the detection area.

4. BUZZER

Confirmation or inhibition of the generation of a brief buzz at each detection of a tag.

5. ISSUER CODE FILTERING

For filtering the tag codes according to the issuer/integrator code.

The value 1 corresponds to the filtering that exists on the traditional readers, i.e. the first code read after a reset of the reader becomes the reference code.

A value of 2 or more indicates filtering according to one or more codes memorised in the EEPROM memory. These codes must be loaded by JBUS command.

6. ISSUER CODE SIZE

Don't change this parameter (always equal to 3).

7. ANTENNA READ LED

For defining the behaviour of the antenna LED. A single value is defined, which corresponds to

event	LED
detection of tag	off for 1 s
tag battery dead	red for 0.3 s
functioning OK	flashing green 3 times per second
defective functioning	flashing red slowly

8. TYPE OF FUNCTIONING

Enables you to choose between

- mode 0 (message generated at each detection of a new tag),
- mode 2 (message generated at each detection of a tag),
- mode 3 (mode 0 plus disappearance message).

Mode 1 is reserved for a special use.

9. FUNCTION TAGS

Permits the recognition of special tag codes with which the configuration of the reader is possible. The presentation of such a tag before the antenna enables the remote configuration of certain parameters of the reader. The function tag manages 7 to 8 parameters.

This function is available via the software version v1.1.3.

If this parameter is inhibited (=oF), all the function tags will be inhibited.

10. JOURNAL (HISTORY)

Permits the dating and timing of certain events. These saves can be read with JBUS commands or with a function tag.

11. TYPE OF RS INTERFACE

For choosing the type of RS interface: RS232, RS422 or RS485.
This interface can be used as a host interface or a maintenance interface. If used as a host interface, choose "nu" (not used) for the OC interface (see next item).

12. TYPE OF OC INTERFACE

For defining one of the open collector interfaces in host interface.
If the host interface is the RS interface, choose "nu" (not used).

13. ADDRESS

For addressing readers connected in a network. For a single reader: do not modify.

14. RATE OF ASYNCHRONOUS SERIAL LINKS

For choosing the rate of the RS link according to the host.

15. CHARACTER FORMAT

In JBUS frame, leave in 8 bits/without parity.
In ASCII or Code Only, choose the format according to the host.

16. FRAME TYPE

For defining the message transmitted following a tag detection.
For example, for tag (0)(123)(CODE_BADGE)

In polling mode, choose JBUS
message = 01 03 0e 30 31 32 33 43 4f 44 45 5f 4b 4a 44 47 4e xx xx
In interruption mode, the choices are
JBUS: message = 02 04 0e 30 31 32 33 43 4f 44 45 5f 4b 4a 44 47 4e xx xx
ASCII: message = 1.0.123CODE_BADGE(CR)(LF)
Code only: message = 123CODE_BADGE

17. POLLING

For choosing how a tag code is transmitted to the host interface.
Polling OFF (interruption mode), the detection of a new tag generates a message that is immediately sent to the interface.
Polling ON, this message is sent only in response to the appropriate JBUS command. If the reader does not receive the command before the disappearance of the tag, the message is lost.

18. MTBM

For defining the Mean Time Between Messages between two transmissions on the open collector link, whether messages for different tags or for repetitions of messages (see the next parameter).

19. NUMBER OF TRANSMISSIONS

In RS interface and interruption mode, this is the maximum number of transmissions of the same message in absence of acknowledgement.
In open collector interface, if this parameter is more than 1, each code is issued twice. The time between two transmissions is set by the previous parameter.

20. OUTPUT 1

Enables the definition of the behaviour of the output when a tag is detected.
The values are

value	display	description
Not used	oF	
copy buzzer	1	activation for 100 ms to read a new tag
read 2 s	2	activation for 2 s to read a new tag
host	3	managed uniquely by JBUS commands
green LED	4	copies the green led of the reader base

21. OUTPUT 2

Enables the definition of the behaviour of the output when a tag is detected.
The values are

value	display	description
Not used	oF	
BF vehicle	1	activation in vehicle mode (see document on function tags)
tag battery low	2	activation if the tag battery is fading
host	3	managed uniquely by JBUS commands
red led	4	copies the red led of the reader base

22. RANGE

Enables the user to choose between 4 range values, from 0 (minimum) to 3 (maximum).
This parameter acts on the detection threshold, while keeping the transmission power of its nominal value.

23. RESERVED

Parameter not accessible to the user.

24. ENTRY 1

Enables the user to confirm the reading of the tags with an entry signal.
In this case, if the entry is high (6Vcc< Vin < 25Vcc), the reading of the tags takes place, otherwise (Vin < 5Vcc) it does not.

25. ENTRY 2

Enables the user to confirm the reading of the tags with an entry signal.
In this case, if the entry is low (Vin < 5Vcc), the reading of the tags takes place, otherwise (6Vcc< Vin < 25Vcc) it does not.

26. RESERVED

Parameter not accessible to the user.

27. PERIOD OF HOPS

Determines the time between two frequency hops in the case of functioning in random frequency hops (channel number = 0, see parameter 2).

28. READER TYPE

Identifies the model of the reader (read only).

An example of a typical configuration of the reader LMB 603X-B is given in Appendix.

4. INSTALLATION

This operation requires technical meanings and must be performed by a confirmed professional.

4.1. FIXING THE READER

Fasten the reader onto a 50 mm pole using the given flanges by placing them onto the holes available on the back plate.

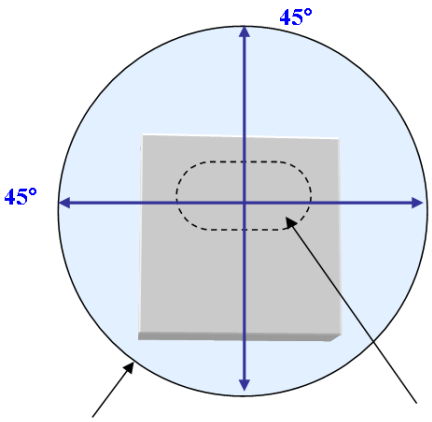
Vertical pole position

Horizontal pole position

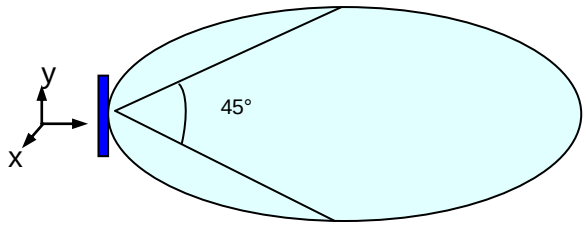
Note: For poles with a bigger diameter or for direct wall mount, any other type of fixing method could be adapted to the back metallic plate as this part will not change the product characteristics.

4.2. POSITIONNING THE READER

The directivity of the antenna in the LMB 603x-B series readers is symetrical 45°x45°.
So the position of the reader on the pole is not really important. (See diagram below)

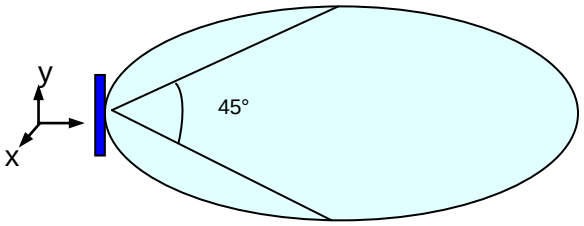


upper view



LMB 6033-B : 4m (12feet)

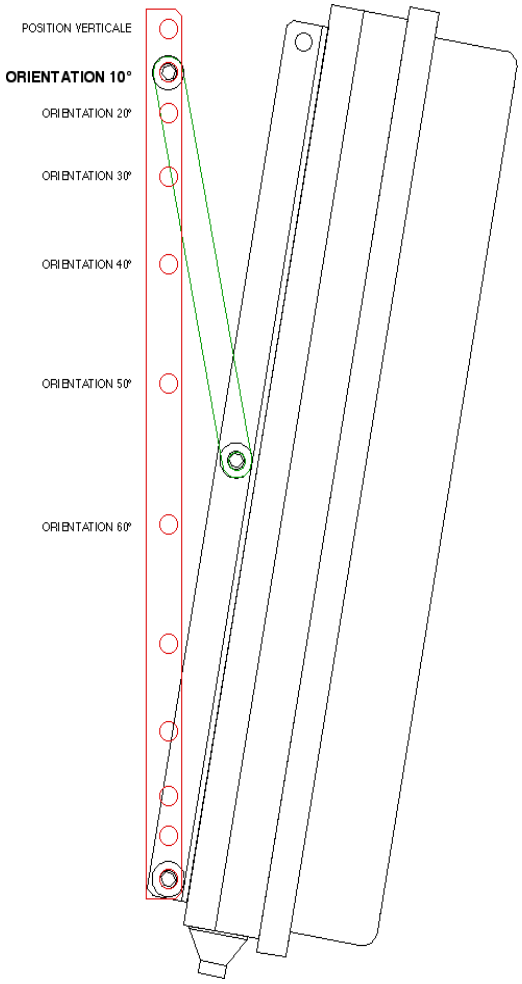
lateral view

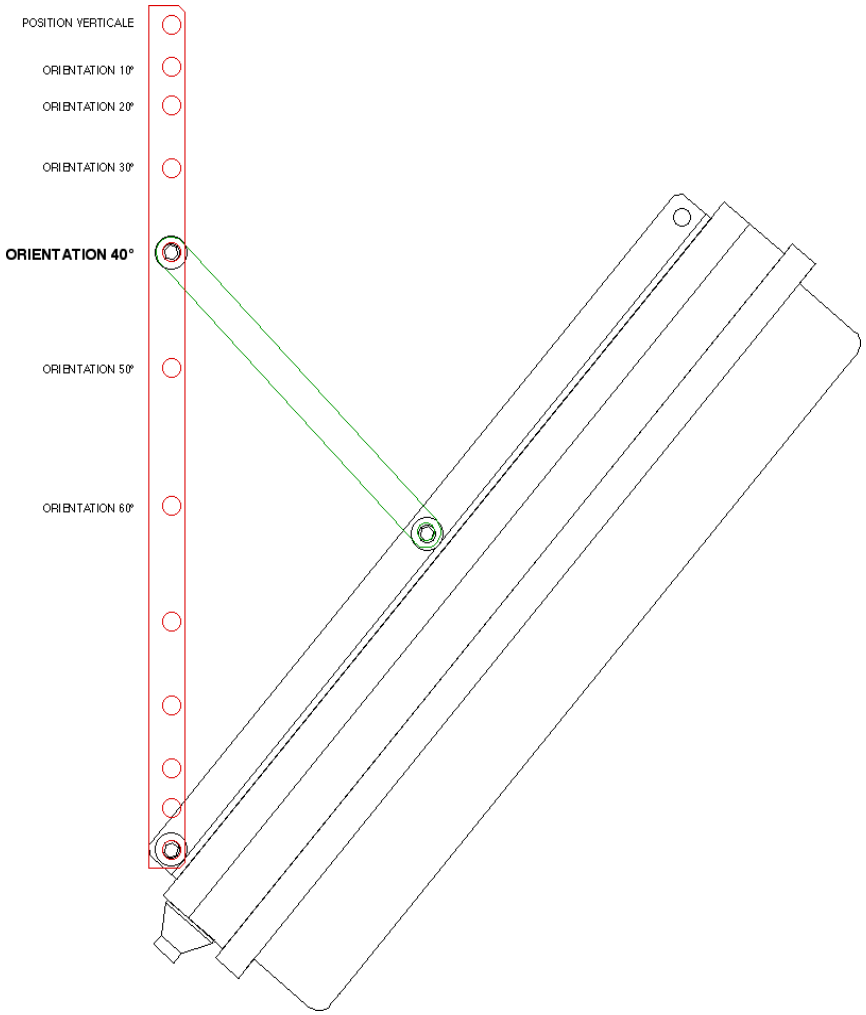


LMB 6033-B : 4m (12feet)

The back plate of the casing in the LMB 603x-B series readers is given with small rods.

The position of these rods allows different inclination angle from 0° to 60° with 10° step to adjust the identification area toward the tag trajectory. (See diagrams below)





4.3. CHOSING THE RIGHT ORIENTATION.

Place the reader in a position that it can radiate directly to the estimated badge position.
The main radiation direction is always perpendicular to the front side cover.

When using the provided mounting flanges the reader can be mounted pivoted. The angle is freely adjustable. The pivot direction then is either horizontally (to the sides) or vertically (to the bottom).

Important :
Please avoid installation in places with direct sunshine exposition where the temperature at reader electronics could reach levels higher than the recommended operating temperature.
If this is inevitable, a weather protection cap must be mounted.

When positioning the reader, please consider the following:

Several readers within close proximity:
When two or more readers are mounted within close proximity, the following hints must be observed:

- Make sure that the readers do not beam directly against each other.
  If necessary, they must be pivoted away from each other.
- The channel numbers must have the most possible distance.
  The distance must be **at least 0.750 MHz,** see table in annexe.

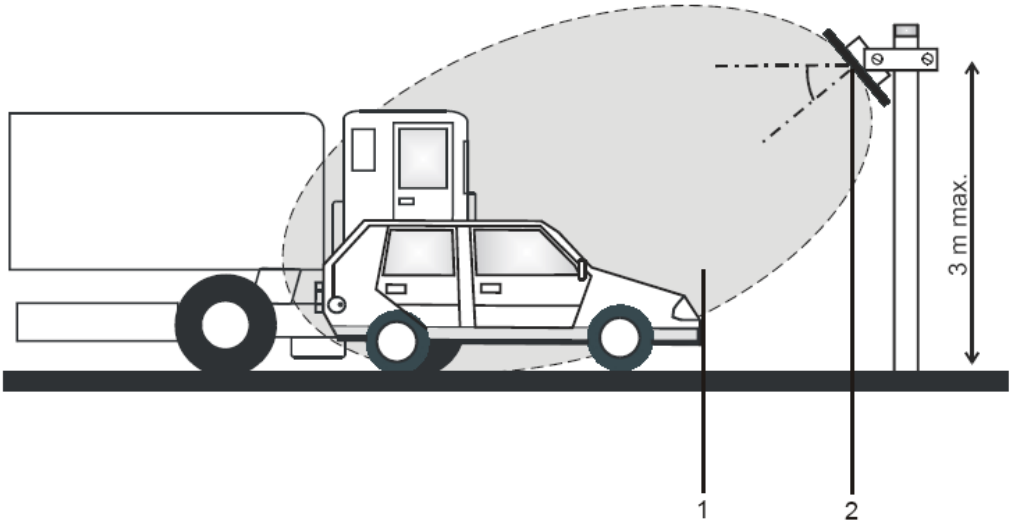
Sources of interferences:
The reading range given is a nominal value which can be reached or exceed in most of conditions. But you'll have to take care that in practice, many disturbances from the environment could affect the reader. Often they might not be changed easily but reduce the practical reading range.
Sources of interference are:

- Devices operating in the same frequency band like WLAN communication devices
- Microwave ovens
- Fluorescent tubes
- Metallic objects like grids, fences or metalized vehicle windshields.

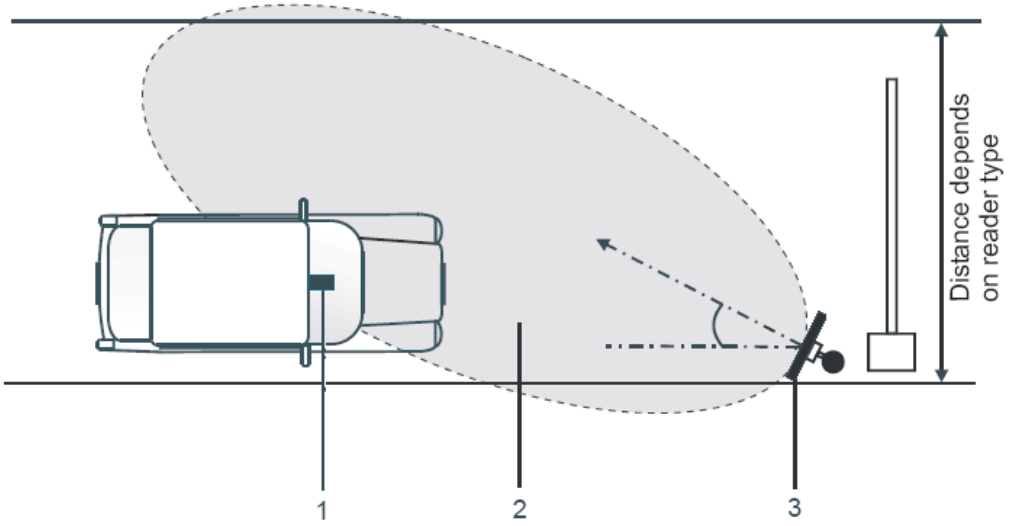
etc.

Important
Do not place readers close to sources of interference to use at its best performances.

Installation example: reading in top-down direction



1	Area of radiated reader field
2	Reader. The alignment must be carried out in such a way, that down tilt and the angle towards the vehicle are both approx. 30 - 45 degrees.



1	Badge, tilted approx. 30 to 45 degrees to perform optimum reader results.
2	Area of radiated reader field
3	Reader. The alignment must be carried out in such a way, that down tilt and the angle towards the vehicle are both approx. 30 - 45 degrees..

To perform best reader results, the badge surface has to be placed as perpendicularly as possible to the reader's main radiation direction. In this case, the badge reflects the maximum of the received signal.

When placing badges in vehicles, the following hints must be observed: Metalized windshields of vehicles may disturb or inhibit proper function of the reader. Refer to manufacturer badge positioning recommendations.

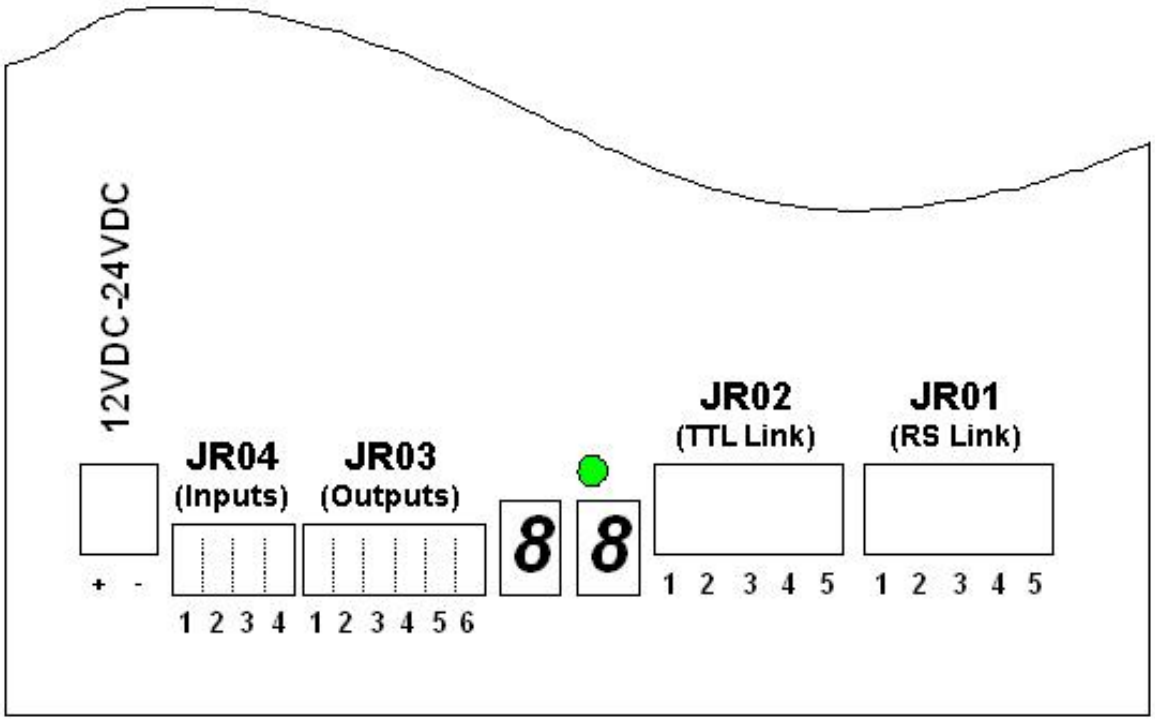
Please consider the correct badge/reader position in top-down reader installations to avoid random identification far from the reader position.

4.4. CABLING

Several communication links are available:

- TTL links: Wiegand26bits or ISO2 (Magstripe ISO 7811-2),
- Computerized serial links: RS 232, RS 422 or RS485

The communication links are located on JR01 & JR 02 connector



4.4.1. TTL LINKS

For the LMB 603x series, the JR02 connector is used for TTL links.
Both the ISO2 and the WIEGAND interfaces available use an Open-collector interface.

For the WIEGAND interface this concerns the two signals DATA1 and DATA0.
For the ISO2 interface, this concerns the three signals STROBE, MDATA and PRES_BADGE.

Interconnection with LMB 603x series readers is shown below :

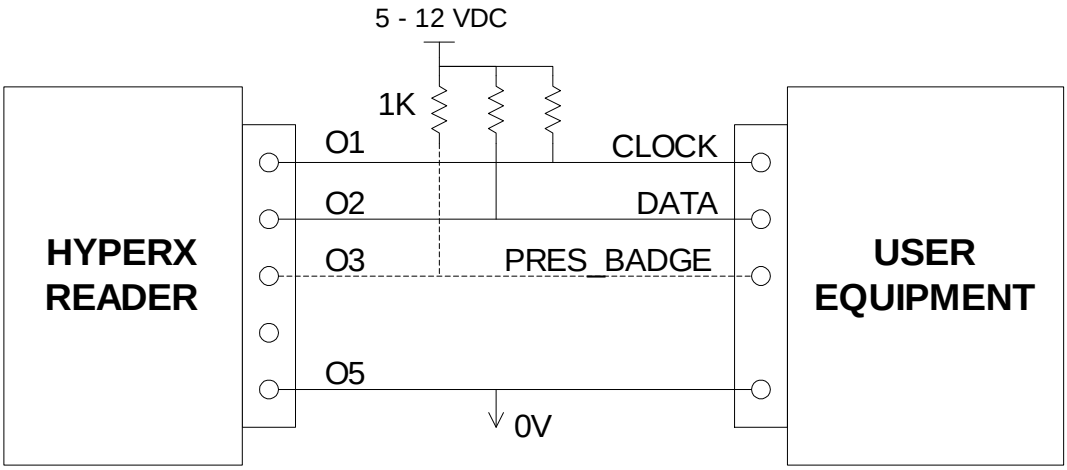
The pins are associated with different signals, depending on the type of link used.

pin	ISO2	WIEGAND
1	STROBE	DATA “1”
2	MDATA	DATA “0”
3	PRES_BADGE	.
4	Valim	Valim
5	GND – 0V	GND – 0V

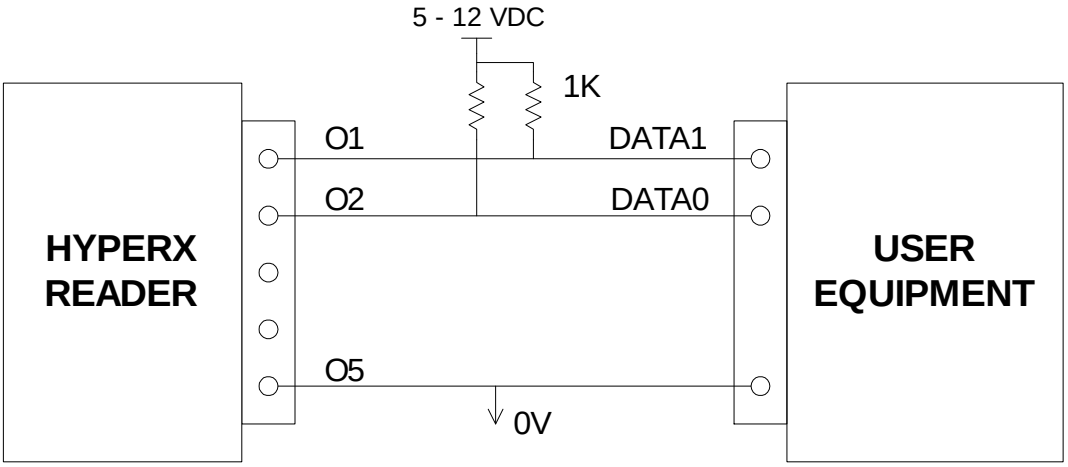
Note: the Valim on pin 4 is internally connected to the supply voltage (+) and could be used for external pull-up resistor if needed.

For correct operation, pull-up resistors (typical values are 1K) must be connected to any voltage supply between 5Vcc and 12Vcc.
On most of access control dedicated controllers, these pull-up resistors could be already included in the user equipment.

Warning :
For correct operation, It is crucial pull-up value measured at reader connector not to go under 4.2Vcc nor over 12.5Vcc to prevent any malfunctioning or the destruction of the reader.



ISO2 connection to reader



WIEGAND connection to reader

4.4.2. RS LINKS

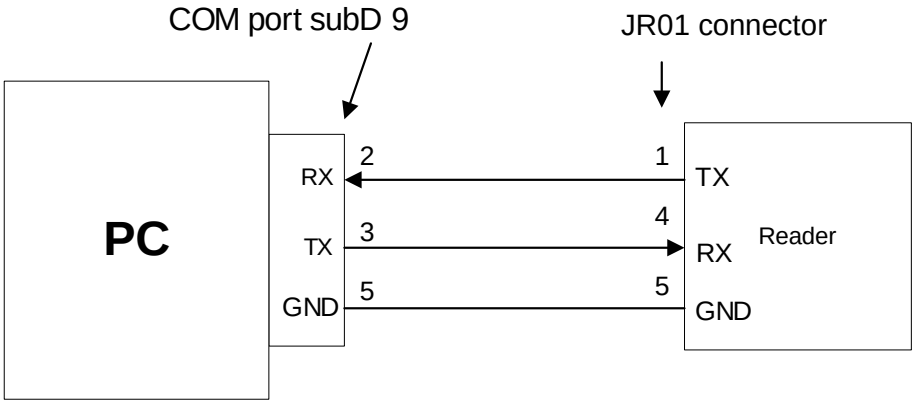
For the LMB 603x series, the JR01 connector is used for Computerised Serial links.

Interconnection with LMB 603x series readers is shown below:

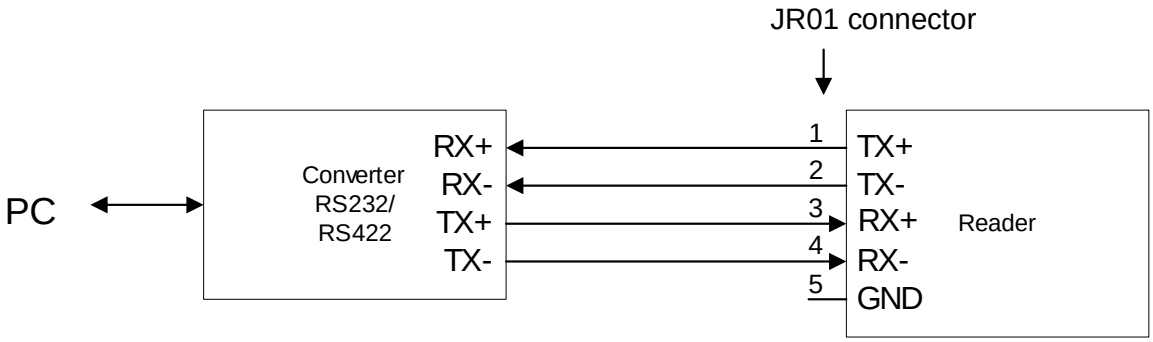
The pins are associated with different signals, depending on the type of link used.

pin	RS-232	RS-422	RS-485
1	TX	TX+	+ V
2	.	TX-	- V
3	.	RX+	.
4	RX	RX-	.
5	GND – 0V	GND – 0V	GND – 0V

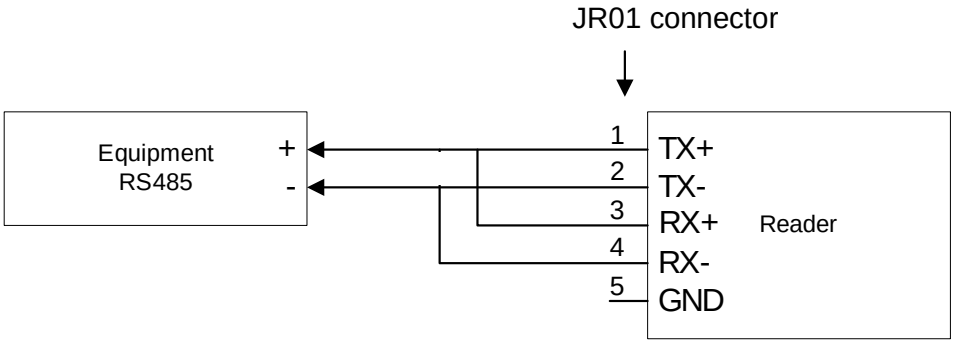
The following figures show how to connect the reader for RS-232, RS-422 and RS-485.



RS232 connection to reader



RS422 connection to reader



RS485 connection to reader

4.4.3. CONNECTION OF 0V

Whether this is necessary or not, depends on the installation.

If user equipment and reader are distant with different local ground potentials, then a communication link may not work if the 0V references are not connected. However connecting them will cause ground currents to circulate.

In general, for large link lengths, a differential link should be used. This also tolerates a large common-mode voltage difference.

Refer to the interfacing manual for the Hyper X readers (ref 13053/104) for complete information about all available connection

5. FUNCTIONING

5.1. POWER SUPPLY

5.1.1. FUNCTIONING VOLTAGE OF THE LMB READER

The reader can be supplied with power between 12 Vcc (consumption in stabilized 1 A max.) and 24 Vcc (consumption in stabilized 0.5 A max.).

For an optimal performance of the reader in terms of reading distance, it is recommended to have a power supply the least noisy possible (ripple + noise <100mVcc).

Warning:
The extreme limits of functioning are between 11 Vcc and 28 Vcc.
It is crucial not to go under 11 V nor over 28 V to prevent any malfunctioning or the destruction of the reader.

The value of the minimal voltage recommended for the correct functioning of the reader is 11.5Vcc. Below this level, the reader can continue to function but with its performances no longer guaranteed, functioning in fail-soft mode (see functioning at voltage limits).

Inside the casing a "low voltage" LED (DT6, see §2.5.2 User-Machine panel description) indicates that the voltage supplied to the detector is about 10.5Vdc.

When low voltage is detected, the reader activates a time out of 20 or 30 seconds. When the time out is up, the reader tries to restart:

- if the voltage is correct, it starts to function
- if the voltage is still low, it reactivates the time out, and so on

In addition, the reader is protected against polarity reversals.

5.1.2. START-UP OF THE READER (INFORMATION RELATING TO THE INTERNAL FUNCTIONING OF THE READER)

The reader starts up in several stages

1- When it is powered up, there is a first inrush current (Ipointe1) corresponding to the load of the condensers of the LMB reader. This inrush current is several amperes for a very short time of 5 to 10ms.

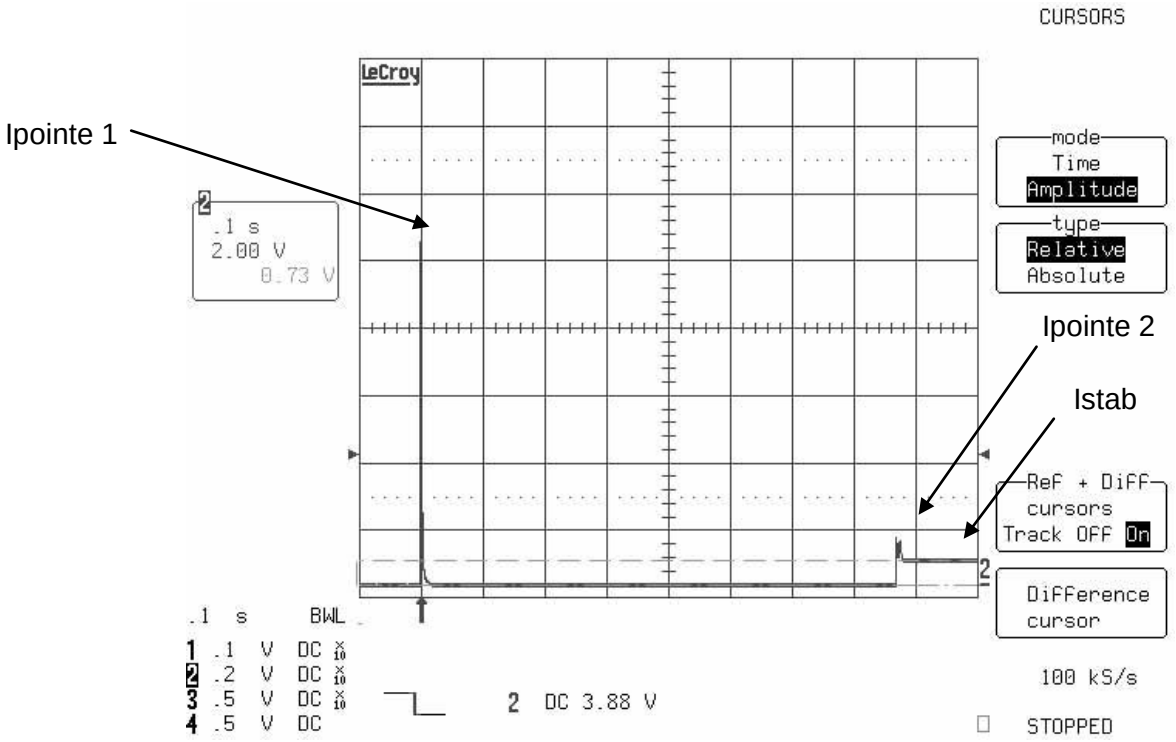
2- After it is powered up, the reader observes for a period the voltage available. This period lasts between 0.5s and 1s depending on the voltage input.

3- If the input voltage is acceptable, there is a second inrush current (Ipointe2), corresponding to the 'real' start-up of the reader. This current is lower than 1.5A with 12Vcc for a time under 100ms. If the voltage supplied to the reader is higher, this second current will be weaker (e.g. lower than 1A with 18Vdc or lower than 0.7A with 24Vcc)

Comment: Ipointe2 current is 1A typical with 12Vcc for 10 to 20 ms

4- Then the current of the reader stabilises (Istab) to a current lower than 1A with 12Vcc or 0.5A with 24Vcc.

Comment: typically, the functioning current is 0.6A typical with 12Vcc.



5.1.3. FUNCTIONING AT VOLTAGE LIMITS

When powered up, the LMB reader observes the voltage input before starting up. If this voltage is lower than 10.5Vcc, the 'low voltage' LED lights up and the reader starts up. The reader may have a degraded functioning until it receives a voltage input of at least 11.5Vcc.

If the reader's voltage input is lower than a minimum voltage of about 9.5Vcc, the reader does not start up and the 'low voltage' led lights up.

If the power source used to supply the reader is too weak, the reader inrush current may lead to a lowering of the input voltage available to the reader; if this voltage becomes lower than Vmin (approx. 9.5Vcc) the reader will stop, which will lead to a rise in the voltage available, so the reader may restart with an inrush current that will lower the available voltage and so on. To prevent this pumping phenomenon, the reader will go into sleep mode for about 20 to 30s, and try to restart when this time is up. If the voltage is correct at the end of this time, the reader starts up again, otherwise it goes into sleep mode for 20 to 30s and so on.

Warning:
If the reader's voltage go over 28Vcc, the reader may be damaged.

5.2. POWERING UP

An auto-test is made with each power up or reset. This can be monitored on the antenna led and, if the reader is opened, on the internal displays which display successively the mnemonic of each test.
When the initialisation is completed, if the result of all the internal tests is correct, the displays switch off. Hence, in the absence of breakdown, the following events can be observed successively.

no.	test	principal led	display	buzzer	duration
1	RAM of work	steady red	P	on	< 1 s
2*	RAM Log p 0	steady red	P0	off	3 s
3	RAM Log p 1	steady red	P1	off	4 s
4	Checksum flash	steady red	PE	off	1 s
5		flashing green at 2 Hz	off	off	ad infinitum

In fact, other tests take place but at less than 50ms and with fugitive display. Only if the test seizes up can the display be useful.

* If the ‘‘log’’ parameter (10) is confirmed, i.e. different from 0, test 2 (display = P0) does not take place. In the production output, the log is confirmed by default, so at the second start-up test 2 does not take place.

If the reader is equipped with an antenna with an auto diagnosis function, so an additional test is made after the auto test and a brief beep indicates that the auto diagnosis is correct. (see also the interface manual ref.13053-104).

5.3. READING THE TAGS

The detection of a tag provokes

- the activation of the buzzer (if confirmed),
- a record in the log (if confirmed),
- the lighting up of the leds of the reader base and of the outputs (if confirmed) as shown in the following table

Event	Reader base LED	Output
detection of tag	off for 1 s	Output n°1 : copy buzzer or active for 2 seconds
tag battery low	red for 0.3 s	Output n°2 : active for 2 seconds
functioning OK	flashing green 2 times per second	Output n°1 : Copy reader base LED
Misfunction warning	red	Output n°2 : Copy reader base LED

5.4. SEARCHING FOR DEFECTS

This operation requires opening the casing and high technical meanings. It must be performed only by a confirmed professional.

The detection of a problem could provokes

- a record in the log (if confirmed),
- the lighting up of the leds of the reader base and of the outputs (if confirmed) as shown in the following table

Event	Reader LED	Output
Detection of an internal problem	Base LED : Red during the problem detection	Output n°2 : Copy reader base LED
RS communication problem	Link Status RS LED stop flashing when data transmission	/
TTL communication problem	Link Status TTL LED stop flashing when data transmission or always ON	/
Power supply problem	Low Voltage LED ON	/

If a defect that can lead to the breakdown of the reader is detected at a higher level via JBus requests, a test of the functioning of the reader must be carried out.

For this you'll must :

- interrupt the power supply
- remove the reader
- remove the cover
- restore the power supply

Local error codes

The search for defects is made at a higher level.
Locally (inside the reader), a hexadecimal error code indicates which test has failed (one bit per test). Depending on the type of error, the reader is or is not capable of functioning.
The table below shows all the tests and the related error bits

no.	display	test	bit(s) of the error code
1	P	external RAM (work part)	2
2	P0	external RAM (Log page 0)	2
3	P1	external RAM (Log page 1)	2
4	PE	checksum Flash memory	1
5	EE	EEPROM memory	3
6	SC	Serial Communications Controller (SCC)	4, 5
7	Sn	component serial number	7
8	rt	component RTC (real time clock)	8
9	IS	RS electric interface	6

Byte of the error code

First digit				Second digit			
MSB			MSB	MSB			MSB
8	7	6	5	4	3	2	1

bit	description	consequence
1	error checksum memory	reader unavailable
2	error external access RAM	reader unavailable
3	error access EEPROM access	reader unavailable
4	error bus SCC	reader unavailable
5	error SCC	reader unavailable
6	error interface RS	reader unavailable
7	error access component serial number	reader unavailable
8	error circuit RTC	no log time & date

Examples

display	**meaning**
04	error access EEPROM
18	error component SCC
40	error access component serial number

APPENDIXES

APPENDIX 1: CE CERTIFICATION

DECLARATION OF CONFORMITY

CE 0682 ⓘ

BALOGH Toulouse
105 Avenue du Général Eisenhower
31023 TOULOUSE cedex 1
FRANCE

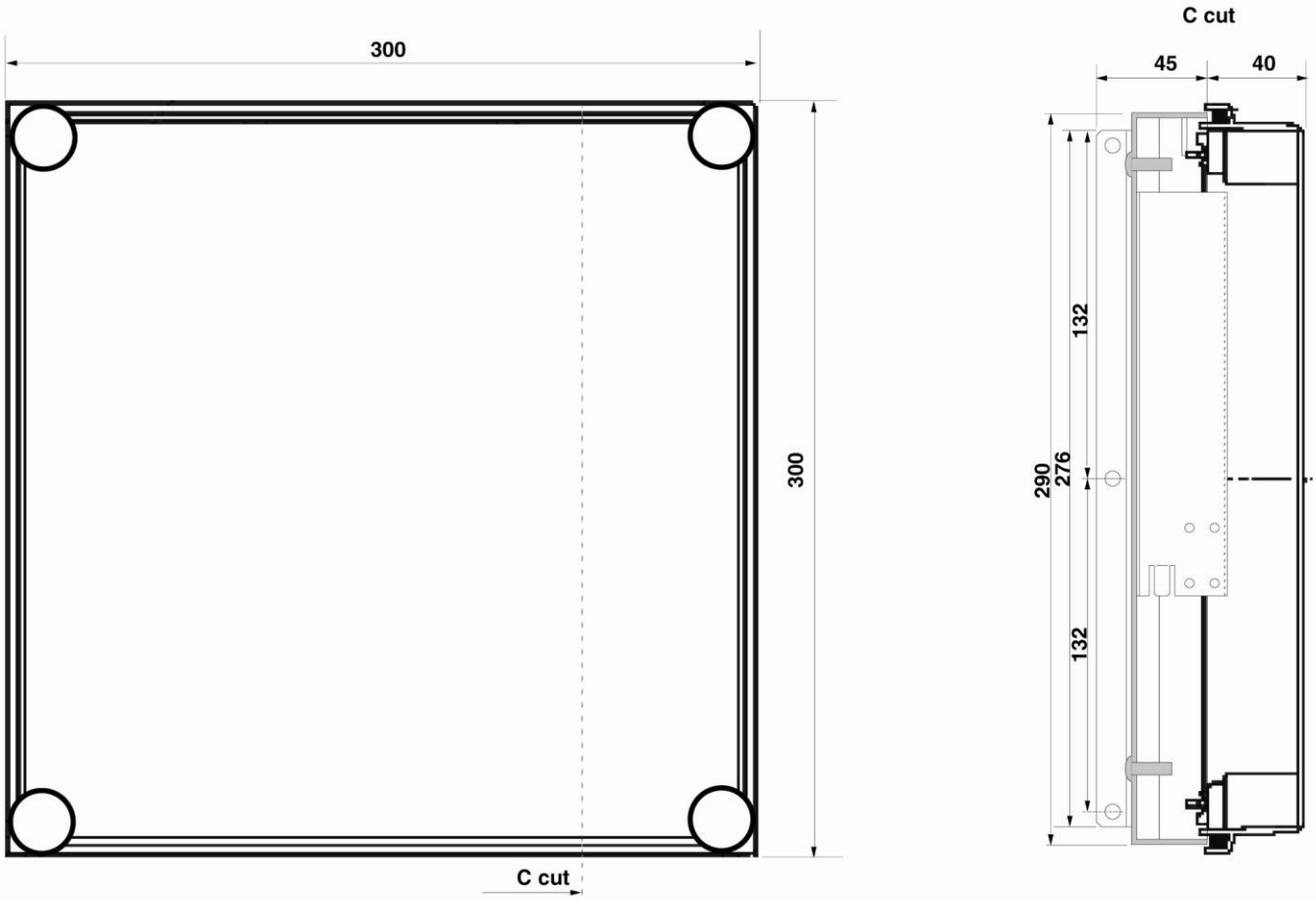
The present declaration certifies that the LMB* device is in conformity with the essential requirements of European Directive R&TTE 1999/5/EC designed to harmonise the legislations of the Member States concerning the use of the radio electric spectrum, electromagnetic compatibility and electrical safety.
This declaration applies to all the units manufactured in conformity with the technical documentation described in Appendix II of the directive. The evaluation of the conformity of the device with the essential requirements of article 3 R&TTE was carried out in conformity with Appendix IV of the directive and the following norms

Radiofrequency spectrum	EN 300 440
EMC	EN 401 489
Electrical safety	EN 60 950
Exposure to electromagnetic fields	EN 50 371

* LMB_6012/6013/6033/6034/6035/7012/7013/7023/7033

APPENDIX 2: TECHNICAL SPECIFICATIONS AND DIMENSIONS

Communication available
• Wiegand26bits, ISO2 (Magstripe ISO 7811-2), RS 232, RS 422, RS485
Reader
• Frequency band: 2.45 GHz
• Transmitting power 4m-version: 75 mW; 6m-version: 200 mW ; 8m version : 350mW
• Transmitting speed badge/reader: 30,000 Baud
• Modulation mode: BPSK (Biphase Shift Keying)
• Reader protocol: HDLC
• Number of channels: 31
Power supply
• Rated voltage: 12 to 24 Volts DC
• Power consumption: 18 watts max
Environmental conditions
• Relative humidity: up to 90%, non-condensing
• Storage temperature: -25° to +80° Celsius
• Operating temperature: -20° to +70° Celsius
Protection class:
• IP 65
Outer dimensions:
• Length: 300 mm • Width: 300 mm
• Height: 85 mm • Weight: 5 kg



APPENDIX 3: TABLE OF FREQUENCIES AND CHANNELS

Sorted by frequency	
Frequency / MHz	**Channel number**
2446.25	31
2446.50	24
2446.75	25
2447.00	26
2447.25	27
2447.50	28
2447.75	29
2448.00	1
2448.25	2
2448.50	3
2448.75	4
2449.00	5
2449.25	6
2449.50	7
2449.75.	8
2450.00	9
2450.25	10
2450.50	11
2450.75	12
2451.00	13
2451.25	14
2451.50	15
2451.75	16
2452.00	17
2452.25	18
2452.50	19
2452.75	20
2453.00	21
2453.25	22
2453.50	23
2453.75	30

Sorted by channel numbers	
Channel number	**Frequency / MHz**
1	2448.00
2	2448.25
3	2448.50
4	2448.75
5	2449.00
6	2449.25
7	2449.50
8	2449.75.
9	2450.00
10	2450.25
11	2450.50
12	2450.75
13	2451.00
14	2451.25
15	2451.50
16	2451.75
17	2452.00
18	2452.25
19	2452.50
20	2452.75
21	2453.00
22	2453.25
23	2453.50
30	2453.75
31	2446.25

APPENDIX 4: EXAMPLE OF CONFIGURATION OF THE SERIAL LINK

A typical configuration is for example one in which the parameters of the serial link have the following values:

- at physical and RS 232 level (no.11) at 9,600 bauds (no.14), 8 bits without parity (no.15),
- at protocol Interrupt mode level (no.17), 4 transmissions max. (no.19), with JBUS (no.16), to address 1 (no.13)

no.	Parameter	Mnemonic	Typical value	Typical value displayed
11	Type of RS interface	tA	RS 232	23
13	JBUS address	Ad	1	1
14	Output	br	9,600 bauds	96
15	Character format	Fo	8 bits without parity	8n
16	Frame type	Fr	JBUS	Jb
17	Polling/Interr	Po	Interruption	off
19	Max. no. of transmissions	nE	4	4